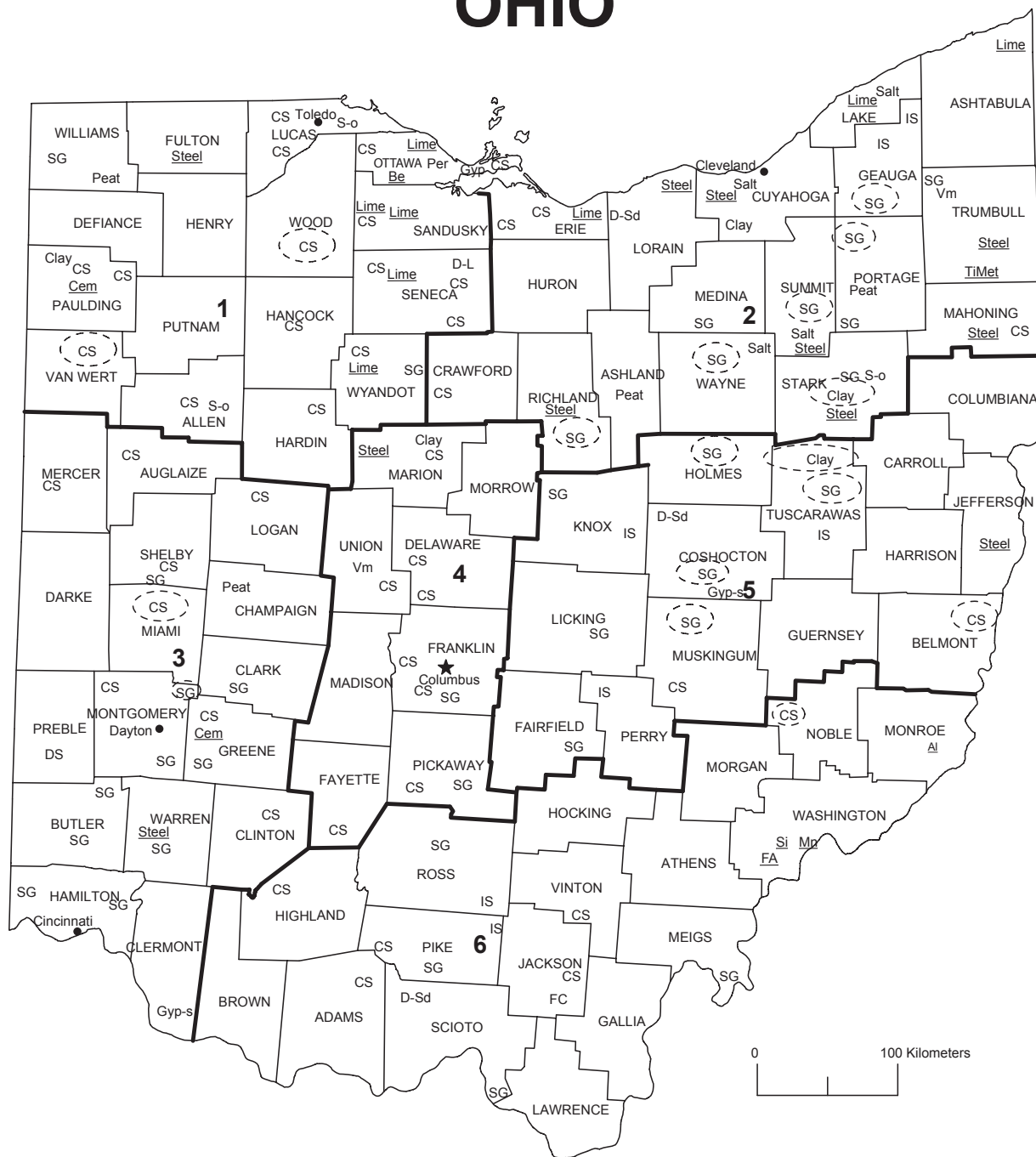


OHIO



LEGEND

- County boundary
- ★ Capital
- City
- 1 — Crushed stone/sand and gravel districts

MINERAL SYMBOLS

- | | |
|-----------------------------|-----------------------------------|
| <u>Al</u> Aluminum plant | FC Fire clay |
| <u>Be</u> Beryllium plant | Gyp Gypsum |
| <u>Cem</u> Cement plant | Gyp-s Synthetic gypsum |
| Clay Common clay | IS Industrial sand |
| CS Crushed stone | <u>Lime</u> Lime plant |
| D-L Dimension limestone | <u>Mn</u> Manganese dioxide plant |
| D-Sd Dimension sandstone | Peat Peat |
| DS Dimension stone | <u>Per</u> Perlite plant |
| <u>FA</u> Ferroalloys plant | |

(Major Producing areas)

- | |
|---|
| S-o Sulfur (oil) |
| Salt Salt |
| SG Construction sand and gravel |
| Si Silicon metal plant |
| <u>Steel</u> Steel plant |
| <u>TiMet</u> Titanium metal plant |
| Vm Vermiculite |
| Concentration of mineral operations |

Source: Ohio Division of Geological Survey/U.S. Geological Survey (2003)

THE MINERAL INDUSTRY OF OHIO

This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the Ohio Department of Natural Resources, Division of Geological Survey, for collecting information on all nonfuel minerals.

In 2003, the estimated value¹ of nonfuel mineral production for Ohio was \$968 billion, based upon preliminary U.S. Geological Survey (USGS) data. This was a slight decrease from that of 2002² and followed a 6.4% decrease from 2001 to 2002. The State remained 15th in the Nation in total nonfuel raw mineral production value, of which Ohio accounted for about 2.5% of the U.S. total.

In 2003, crushed stone by value remained Ohio's leading nonfuel mineral, followed by construction sand and gravel, salt, lime, cement (portland and masonry), and industrial sand and gravel (in descending order of value). Crushed stone and construction sand and gravel accounted for about 57% of the State's total nonfuel raw mineral production value. Increases mostly in the values of lime, salt, and portland cement (descending order of change) were more than offset by decreases in crushed stone and construction sand and gravel (table 1), resulting in a net decrease in total nonfuel mineral value for the year.

In 2002, most of the State's drop in value resulted from decreases in the production and values of salt, down more than \$30 million, lime, down about \$16 million, crushed stone, down \$10 million, and construction sand and gravel, down \$6 million (table 1).

Compared with USGS estimates of the quantities produced in the other 49 States during 2003, Ohio remained 3d of 4 fire-clay-producing States, 4th in salt and lime, 5th in construction sand and gravel and common clays, and 10th in industrial sand and gravel. While the State decreased to seventh from sixth in crushed stone, it continued to be a significant producer of portland and masonry cements and dimension stone. The State's mines produced exclusively industrial minerals and coal; any metals, especially those of aluminum and steel, produced in the State were processed from materials received from other domestic and foreign sources. In 2003, Ohio continued to be the Nation's second leading raw-steel-manufacturing State with an estimated output of about 11.9 million metric tons (Mt) of raw steel (American Iron and Steel Institute, 2004, p. 76). Based upon USGS annual data, the State rose to second from third in the production of primary aluminum in 2003.

The Ohio Department of Natural Resources, Division of Geological Survey (ODGS), provided the following narrative information,³ based upon its own surveys, estimates, and data that it acquired from other State agencies. Based upon preliminary data compiled by the ODGS, approximately 350 companies produced industrial (nonfuel) minerals from more than 700 Ohio mining and quarrying operations in 2003. Thirty-eight of these operations produced multiple mineral commodities, some of which also included the mining of coal (for example, coal and clay). More than 5,300 people were directly employed mining industrial minerals in Ohio during 2003.

Commodity Review

Industrial Minerals

Clay and Shale.—As reported to the ODGS, 38 companies at 46 operations in 24 Ohio counties produced clay and/or shale during 2003. Combined production totaled 2 million metric tons (Mt), a 31% decrease from that of 2002. The apparent decrease in production was largely the result of a change in reporting requirements; the Ohio Environmental Protection Agency (OEPA) was given regulatory authority over the extraction (mining) of low-permeability shales and clays to be used as landfill liners in 2003. The reporting of this production was switched from the ODGS to the OEPA. Columbiana, Cuyahoga, Marion, and Tuscarawas Counties accounted for more than 50% of the total clay and/or shale production in Ohio during the year. Belden Brick Co., Glen-Gary Brick, Inc., and Hydraulic Press Brick Co., were the leading clay- and/or shale-producing companies.

The face brick, lightweight aggregate, and art pottery industries remained very active. At least one major, national brick manufacturer actively explored for new clay reserves in southern Ohio during early 2004.

Salt.—Three companies at five operations in five Ohio counties produced salt during 2003. Production from two large underground rock salt mines in Cuyahoga and Lake Counties was estimated by the ODGS to be slightly less than 3 Mt, and production at three salt-solution-mining operations was somewhat less than 1 Mt for a total of about 3.5 Mt, about a 25% increase from 2002. Cargill Salt Inc.

¹The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending upon the mineral products. Production may be measured by mine shipments, mineral commodity sales, or marketable production (including consumption by producers) as is applicable to the individual mineral commodity.

All 2003 USGS mineral production data published in this chapter are preliminary estimates as of July 2004 and are expected to change. For some mineral commodities, such as construction sand and gravel, crushed stone, and portland cement, estimates are updated periodically. To obtain the most current information, please contact the appropriate USGS mineral commodity specialist. Specialist contact information may be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals/contacts/comdir.html>; alternatively, specialists' names and telephone numbers may be obtained by calling USGS information at (703) 648-4000 or by calling the USGS Earth Science Information Center at 1-888-ASK-USGS (275-8747). All Mineral Industry Surveys—mineral commodity, State, and country—also may be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals>.

²Values, percentage calculations, and rankings for 2002 may differ from the Minerals Yearbook, Area Reports: Domestic 2002, Volume II, owing to the revision of preliminary 2002 to final 2002 data. Data for 2003 are preliminary and are expected to change; related rankings also may change.

³Mark Wolfe, a Geologist with the Ohio Division of Geological Survey, authored the text of the State mineral industry information provided by that State agency.

and Morton International, Inc. were the dominant Ohio salt producers. The major use of salt mined in Ohio is for highway deicing applications.

Sand and Gravel.—Sand and gravel was produced by 214 companies at an estimated 297 operations in 59 Ohio counties plus Lake Erie in 2003. Production increased 1.2 % to 47.5 Mt compared to 2002. Five counties, located primarily in the State's metropolitan areas, produced more than 4 Mt each in 2003: Hamilton (5.0 Mt), Butler (4.5 Mt), Portage (4.4 Mt), Franklin (4.2 Mt), and Stark (4.2 Mt). Most Ohio sand and gravel operations are small to medium in size, although five pits produced more than 1 Mt each, led by Olen Corp.'s Columbus Plant No. 3 (2.4 Mt).

Sand, Industrial.—Sandstone and conglomerate were produced by 20 companies at 31 operations in 17 Ohio counties during 2003. Production was 1.5 Mt, an 11% decrease from 2002. Geauga, Perry, Knox, Trumbull, and Pike Counties accounted for 80% of the total sandstone and conglomerate production. Best Sand Corp. and Oglebay Norton Co. were the leading sandstone producing companies in the State. Ohio's crushed sandstone and conglomerate were used primarily for glassmaking.

Stone, Crushed and Dimension.—Limestone and dolomite were produced by 61 companies at 122 operations in 49 Ohio counties in 2003. Production totaled 70.6 Mt, a 1.6% increase from 2002. The counties that produced the largest quantity of limestone and dolomite in 2003 were Erie (7.3 Mt), Ottawa (6.6 Mt), Franklin (5.9 Mt), Delaware (5.1 Mt), and Seneca (4.3 Mt) Counties. In 2003, crushed stone for road construction was the primary use for Ohio limestone and dolomite.

Shelly Materials, Inc. (an Ohio affiliate of Oldcastle Materials, Inc.) was the largest producer of crushed stone in Ohio during 2003. Shelly also was the most active in acquiring additional crushed stone operations during 2003, purchasing Stoneco, Inc., Ohio's fifth largest crushed-stone producer. Hanson Aggregates Midwest, Inc. also was active, acquiring the Wagner quarry (Sandusky, Ohio), an operation that has the capacity to produce more than 2 Mt annually.

Dimension sandstone production increased 1.3% to 53,600 metric tons (t), the highest level of production since 1986. Demand for the Mississippian age Berea Sandstone, Pennsylvanian age Massillon (Briar Hill) sandstone, and Mississippian age sandstone of the Buena Vista Member of the Cuyahoga Formation remains strong for institutional and residential projects.

Other Industrial Minerals.—One company at one operation in Ottawa County produced gypsum. Production totaled more than 100,000 t. According to the ODGS, The total value of gypsum sold in 2003 was about \$430,000. The major uses of Ohio gypsum in 2003 were as a soil conditioner and a retarder in cement applications.

Peat production in Ohio, based upon ODGS public data, during 2003, remained small, totaling about 400 t at a value of approximately \$12,000.

Government Programs

The Ohio Governor's Jobs and Progress Plan, announced in August 2003, devoted \$5 billion during the next 10 years to maintain and expand Ohio's highway network. The plan was funded by a 6-cent-per-gallon increase in the State's gasoline sales tax to be phased in during 3 years and an increase in the percentage of Federal gasoline tax returned to Ohio (a minimum 95% return). It was estimated that the plan would create 4,000 highway construction jobs and additional employment in the Ohio aggregate industry.

The 2002 Report on Ohio Mineral Industries, prepared annually by the ODGS, is available online at URL <http://www.ohiodnr.com/geosurvey/> and contains detailed production, employment, and geologic information on each industrial mineral operation in the State. An online, interactive Ohio mineral industries map at the same Web site provides direct access to industrial minerals information for each operation shown on the map. Two important publications were also recently released by the ODGS in 2003. The first is a guidebook to the Pennsylvanian age Sharon formation in northeast Ohio, which is a significant source of high-silica sand (Foos and others, 2003). The second publication is a detailed investigation into the origins of possibly the single most complex geologic structure exposed in Ohio, the Serpent Mound disturbance in Adams, Highland, and Pike Counties (Baranoski and others, 2003).

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- Foos, A.M., Wells, N.A., Evans, J.E., Hannibal, J.T., and Waugh, D.A., 2003, Pennsylvanian Sharon Formation, past and present—Sedimentology, hydrogeology, and historical and environmental significance: Ohio Division of Geological Survey Guidebook 18, 93 p.

TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN OHIO^{1,2}

(Thousand metric tons and thousand dollars)

Mineral	2001		2002		2003 ^P	
	Quantity	Value	Quantity	Value	Quantity	Value
Cement:						
Masonry	74	9,000 ^e	W	W	85	11,100 ^e
Portland	1,040	80,400 ^e	1,020	78,000 ^e	1,050	80,900 ^e
Clays, common	1,320	7,410	1,310	7,820	1,310	7,820
Gemstones	NA	3	NA	4	NA	4
Lime	1,900	114,000	1,630	98,100	1,700	110,000
Sand and gravel:						
Construction	50,400	256,000	48,700	250,000	47,000	242,000
Industrial	1,120	30,700	1,000	28,900	1,040	29,700
Stone:						
Crushed	75,900	339,000	72,600	329,000	68,800	310,000
Dimension	31	5,150	30	4,990	30	4,860
Combined values of clays (fire), gypsum (crude), peat, salt, and value indicated by symbol W	XX	198,000	XX	176,000	XX	172,000
Total	XX	1,040,000	XX	973,000	XX	968,000

^eEstimated. ^PPreliminary. NA Not available. W Withheld to avoid disclosing company proprietary data; value included with "Combined values" data.

XX Not applicable.

¹Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

²Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 2
OHIO: CRUSHED STONE SOLD OR USED, BY KIND¹

Kind	2001				2002			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone ²	92	66,500	\$293,000	\$4.41	92	61,700	\$275,000	\$4.45
Dolomite	13	8,970	43,700	4.88	14	10,600	52,600	4.98
Sandstone	6	381	1,610	4.23	4	385	1,640	4.25
Total or average	XX	75,900	339,000	4.46	XX	72,600	329,000	4.53

XX Not applicable.

¹Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

²Includes limestone-dolomite reported with no distinction between the two.

TABLE 3
OHIO: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2002, BY USE¹

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Construction:			
Coarse aggregate (+1 1/2 inch):			
Macadam	W	W	\$4.29
Riprap and jetty stone	2,090	\$10,400	4.97
Filter stone	W	W	5.51
Other coarse aggregates	533	2,240	4.21
Total or average	2,620	12,600	4.82
Coarse aggregate, graded:			
Concrete aggregate, coarse	2,480	11,800	4.75
Bituminous aggregate, coarse	1,560	8,780	5.62
Bituminous surface-treatment aggregate	537	2,500	4.65
Railroad ballast	165	682	4.13
Other graded coarse aggregates	2,170	10,400	4.79
Total or average	6,910	34,100	4.94
Fine aggregate (-3/8 inch):			
Stone sand, concrete	113	460	4.07
Stone sand, bituminous mix or seal	344	1,510	4.38
Screening, undesignated	W	W	4.02
Other fine aggregates	597	2,960	4.96
Total or average	1,050	4,930	4.67
Coarse and fine aggregates:			
Graded road base or subbase	4,540	20,400	4.50
Unpaved road surfacing	612	2,290	3.75
Crusher run or fill or waste	310	1,170	3.76
Other coarse and fine aggregates	8,990	39,100	4.35
Total or average	14,400	63,000	4.36
Other construction materials	1,910	7,290	3.82
Agricultural, limestone	588	2,580	4.38
Chemical and metallurgical:			
Cement manufacture	(2)	(2)	3.58
Lime manufacture	(2)	(2)	5.51
Dead-burned dolomite manufacture	(2)	(2)	5.51
Flux stone	(2)	(2)	4.13
Total or average	3,990	15,100	3.79
Special:			
Mine dusting or acid water treatment	(2)	(2)	4.41
Asphalt fillers or extenders	(2)	(2)	5.51
Whiting or whiting substitute	(2)	(2)	12.68
Other fillers or extenders	(2)	(2)	5.84
Total or average	411	2,550	6.21
Other miscellaneous uses and specified uses not listed	5,030	23,400	4.65
Unspecified: ³			
Reported	20,700	96,200	4.65
Estimated	15,000	67,000	4.49
Total or average	35,700	163,000	4.58
Grand total or average	72,600	329,000	4.53

W Withheld to avoid disclosing company proprietary data; included with "Other."

¹Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

²Withheld to avoid disclosing company proprietary data; included in "Total."

³Reported and estimated production without a breakdown by end use.

TABLE 4
OHIO: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2002, BY USE AND DISTRICT¹

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3		District 4	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Construction:								
Coarse aggregate (+1 1/2 inch) ²	2,140	10,000	W	W	217	1,230	W	W
Coarse aggregate, graded ³	2,860	13,400	387	2,890	1,510	6,990	145	880
Fine aggregate (-3/8 inch) ⁴	320	1,430	11	49	133	612	18	80
Coarse and fine aggregate ⁵	4,530	19,700	W	W	1,340	6,130	W	W
Other construction materials	911	3,530	359	1,270	151	777	469	1,650
Agricultural ⁶	W	W	W	W	W	W	W	W
Chemical and metallurgical ⁷	1,920	7,770	W	W	W	W	W	W
Special ⁸	W	W	W	W	W	W	--	--
Other miscellaneous uses	2,100	9,490	122	565	435	2,200	2,330	10,900
Unspecified: ⁹								
Reported	5,220	28,100	390	1,810	3,980	19,000	6,530	29,900
Estimated	7,600	34,000	4,000	19,000	1,000	4,400	--	--
Total	27,800	128,000	11,900	51,800	9,160	42,900	10,800	48,300
	District 5		District 6		Unspecified districts			
	Quantity	Value	Quantity	Value	Quantity	Value		
Construction:								
Coarse aggregate (+1 1/2 inch) ²	31	162	W	W	--	--		
Coarse aggregate, graded ³	W	W	W	W	--	--		
Fine aggregate (-3/8 inch) ⁴	W	W	W	W	--	--		
Coarse and fine aggregate ⁵	W	W	2,470	12,700	--	--		
Other construction materials	18	64	--	--	--	--		
Agricultural ⁶	86	313	196	1,140	--	--		
Chemical and metallurgical ⁷	--	--	--	--	--	--		
Special ⁸	W	W	--	--	--	--		
Other miscellaneous uses	--	--	44	266	--	--		
Unspecified: ⁹								
Reported	3,580	13,200	695	3,140	293	1,070		
Estimated	1,200	4,600	1,200	5,400	--	--		
Total	5,420	21,300	7,240	35,700	293	1,070		

W Withheld to avoid disclosing company proprietary data; included in "Total." -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes filter stone, macadam, riprap and jetty stone, and other coarse aggregates.

³Includes bituminous aggregate (coarse), bituminous surface-treatment aggregate, concrete aggregate (coarse), railroad ballast, and other graded coarse aggregates.

⁴Includes screening (undesignated), stone sand bituminous mix or seal, stone sand (concrete), and other fine aggregates.

⁵Includes crusher run (select material or fill), graded road base or subbase, unpaved road surfacing, and other coarse and fine aggregates.

⁶Includes agricultural limestone.

⁷Includes cement manufacture, dead-burned dolomite, flux stone, and lime manufacture.

⁸Includes asphalt fillers or extenders, mine dusting or acid water treatment, whitening or whitening substitute, and other fillers and extenders.

⁹Reported and estimated production without a breakdown by end use.

TABLE 5
OHIO: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2002,
BY MAJOR USE CATEGORY¹

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)	8,740	\$43,900	\$5.03
Plaster and gunite sands	152	1,490	9.81
Concrete products (blocks, bricks, pipe, decorative, etc.)	790	4,770	6.04
Asphaltic concrete aggregates and other bituminous mixtures	3,460	17,600	5.09
Road base and coverings	2,340	13,600	5.81
Road stabilization (cement and lime)	348	2,380	6.83
Fill	3,490	14,200	4.06
Snow and ice control	117	459	3.92
Filtration	77	452	5.87
Other miscellaneous uses ²	2,790	15,900	5.72
Unspecified: ³			
Reported	22,200	115,000	5.18
Estimated	4,200	20,000	4.83
Total or average	48,700	250,000	5.14

¹Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

²Includes roofing granules.

³Reported and estimated production without a breakdown by end use.

TABLE 6
OHIO: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2002,
BY USE AND DISTRICT¹

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products ²	460	2,260	2,920	15,700	2,460	13,200
Asphaltic concrete aggregates and other bituminous mixtures	W	W	1,300	6,840	615	3,050
Road base and coverings ³	174	967	652	3,970	623	3,550
Fill	36	151	970	5,380	1,960	6,340
Other miscellaneous uses ⁴	249	1,440	393	2,650	284	1,890
Unspecified: ⁵						
Reported	--	--	2,660	15,000	11,600	56,400
Estimated	120	500	1,700	8,400	1,100	5,400
Total	1,040	5,310	10,600	57,900	18,600	89,900

Use	District 4		District 5		District 6	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products ²	1,130	6,260	1,410	6,320	1,290	6,360
Asphaltic concrete aggregates and other bituminous mixtures	W	W	837	3,960	127	642
Road base and coverings ³	530	3,460	579	3,090	127	905
Fill	92	495	380	1,580	54	226
Other miscellaneous uses ⁴	2,130	11,700	447	2,040	56	293
Unspecified: ⁵						
Reported	1,200	6,100	3,560	20,200	3,250	17,500
Estimated	--	--	700	3,500	610	2,500
Total	5,090	28,000	7,910	40,700	5,520	28,400

W Withheld to avoid disclosing company proprietary data; included in "Other miscellaneous uses." -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes plaster and gunite sands.

³Includes road and other stabilization (cement and lime).

⁴Includes filtration, roofing granules, and snow and ice control.

⁵Reported and estimated production without a breakdown by end use.